

In re Application of Hans-Wilm Heinrich  
Serial No. 10/727,247  
Filed: December 3, 2003

RESPONSE TO NON-FINAL OFFICE ACTION OF FEBRUARY 7, 2005

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**Remarks**

**Introduction**

By this paper, applicant responds to the pending Office Action.

In light of the withdrawal of claims 1-20 and 30-35, applicant has cancelled such claims from this patent application. Furthermore, applicant has added new claims 36 through 41 so that claims 21-29 and 36-41 remain in the application. As will become apparent from the discussion hereinafter, applicant respectfully submits that the claims are allowable over the applied documents.

**Rejection under 35 USC §102(b) by Ichikawa et al.**

The Patent Examiner has rejected claims 21 and 24-29 as being anticipated by U.S. Patent No. 6,207,262 to Ichikawa et al. Applicant respectfully submits that the rejection is without merit for the following reasons.

The first point to keep in mind is that claim 21 refers to the compositional aspect in the starting powder mixture via the providing step, which reads:

... providing a powder mixture comprising tungsten carbide powder  
, a binder metal powder comprising at least one metal of the iron  
group or an alloy thereof, and at least one or both of a solid solution  
carbide powder of zirconium and niobium or a solid solution  
carbonitride powder of zirconium and niobium.

This is in contrast to the portion of the substrate-related disclosure of Ichikawa et al. in which there is a reference (see Column 1, lines 55-67)<sup>1</sup> shorthand expression “(Ti, Ta, Nb, Zr) C·N”.<sup>2</sup> Applicant submits that this substrate-related expression does not teach or suggest the claimed, “... at least one or both of a solid solution

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<sup>1</sup> See Column 2, lines 25-34, which pertains to the substrate.

<sup>2</sup> The text defines this expression as: “... one or more carbides, nitrides and carbonitrides of Ti, Ta, Nb and/or Zr, such as TiC, TiN, TiCN, TaC, TaN, TaCN, NbC, NbN, NbCN, ZrC, ZrN and ZRCN, as well as two or more solid solutions thereof (hereinafter “(Ti, Ta, Nb, Zr) C N”) as a dispersed phase forming component, ...” See Column 1, lines 59-64.

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carbide powder of zirconium and niobium or a solid solution carbonitride powder of zirconium and niobium”.

In the description of Embodiment 1 Ichikawa et al. makes reference to material powders that include the shorthand expression “(Ti, Ta, Nb, Zr) C N”, but this broad shopping list-like expression cannot be used to address the claimed powders. In fact, the examples in TABLE 2<sup>3</sup> support the argument that Ichikawa et al. does not address the use of the claimed solid solution carbide powder or the claimed solid solution carbonitride powder since these materials are not solid solutions of zirconium and niobium.

Claims 24-29 depend in one fashion or another from claim 21, and hence, are allowable for the reasons advanced in support of the allowance of claim 21.

Further, the Patent Examiner has cited compositions s, t, and u against claim 28. Claim 28 reads:

28. The method of claim 21 wherein the total of the solid solution carbide powder of zirconium and niobium and the solid solution carbonitride powder of zirconium and niobium comprises between about 1 weight percent and about 15 weight percent of the total mass of said powder mixture.

These compositions s, t and u do not show a solid solution (carbide or carbonitride) powder of zirconium and niobium, but instead, show (Ti, Zr, Nb)CN, (Ta, Nb, Zr)C and (Ti, Ta, Zr, Nb)C, respectively. Hence, applicant submits that this portion of Ichikawa et al. cannot be effective against the invention per claim 28.

Applicant request the removal of this rejection and the issuance of an indication of the allowability of the claims under rejection.

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<sup>3</sup> The patent examiner cites Examples s, t and u in Paragraph 8 of the Office Action. Example s uses 2.5 weight percent (Ti, Zr, Nb)CN, Example t uses 1 weight percent (Ta, Zr, Nb)C, and Example u uses 1 weight percent (Ti, Ta, Zr, Nb)C.

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Rejection under 35 USC §102(a) by Usami

The patent examiner has rejected claims 21, 22-24, 26, 27 and 28 as being fully anticipated by U.S. Patent Application Publication No. 2003/0129456 to Usami. Applicant respectfully submits that the rejection is without merit for the following reasons.

The discussion found at Paragraphs [0104] through [0112], as well as at Paragraphs [0120], [0118], [0092] and [0116], of Usami pertains to the sintered cemented carbide substrate and not the powder mixture. As set forth above, claim 21 recites [in part], "... providing a powder mixture comprising tungsten carbide powder, a binder metal powder comprising at least one metal of the iron group or an alloy thereof, and at least one or both of a solid solution carbide powder of zirconium and niobium or a solid solution carbonitride powder of zirconium and niobium." Applicant submits that any disclosure in Usami about the sintered carbide substrate is not relevant to these claims under rejection.

Insofar as the discussion found at Paragraphs [0124] – [0125] of Usami is concerned, applicant submits that this text does not contain a clear teaching or disclosure that addresses the claimed solid solution carbide powder or the claimed solid solution carbonitride powder. The initial text of Paragraph [0124] of Usami reads:

In order to manufacture the cemented carbide mentioned above, for example, 80 to 90% by weight of tungsten-carbide powder of 0.5-10  $\mu$ m of mean particle diameters, 0.1-10 % by weight of at least one powder of carbide, nitride and carbonitride of Zr and Nb or powder of its solid solution of 0.5 10  $\mu$ m of mean particle diameters in total amount; ...

Along this line, the disclosure in Usami must be adequate to enable possession of the claimed subject matter without undue experimentation. The determination of what constitutes undue experimentation requires the application of a standard of reasonableness that takes into consideration the nature of the invention and the state

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of the art. See Elan Pharmaceuticals, Inc. V. Mayo Foundation, 1373, 1376-1377 (Fed. Cir. 2003). Here, in light of the fact that the technical art is not predictable in the sense of the predictability of the mechanical arts and the fact that the specification of Usami does not give specific guidance toward the use of the claimed solid solutions<sup>4</sup>, weighs against the anticipatory nature of Usami vis-a-vis the claims.

Claims 22-24 and 26-28 depend in one fashion or another from claim 21, and hence, are allowable for the reasons advanced in support of the allowance of claim 21.

Further, claims 22 and 23 each call for certain mass ratios of the niobium and the zirconium. In the rejection, the Patent Examiner refers to certain samples in Table 3 of Usami. Applicant submits that the compositions in these tables do not address the instant invention since they show the use of NbC and ZrC as the starting components in contrast to the claimed components that are a solid solution of zirconium and niobium with their respective mass ratios of elements. More specifically, claim 22 recites:

22. The method of claim 21 wherein the solid solution carbide powder of zirconium and niobium or the solid solution carbonitride powder of zirconium and niobium having a mass ratio  $Nb/(Zr + Nb)$  equal to greater than about 0.5.

Claim 23 recites:

23. The method of claim 22 wherein the solid solution carbide powder of zirconium and niobium or the solid solution carbonitride powder of zirconium and niobium having a mass ratio  $Nb/(Zr + Nb)$  greater than or equal to about 0.6.

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<sup>4</sup> The lack of any specific direction provided by this text is emphasized by the examples in Usami. The examples do not contain a solid solution carbide of only zirconium and niobium and/or a solid solution carbonitride of only zirconium and niobium, but instead, appear to recite only NbC or ZrC.

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Applicant submits that the Patent Examiner cannot take the mass ratios for the simple carbides of zirconium and niobium and use this disclosure to address the claimed mass ratios for a zirconium-niobium solid solution starting powder.

The Patent Examiner uses the disclosure found at Paragraph [0116] to address claim 28. Applicant submits that the disclosure at Paragraph [0116] pertains to the substrate and not the starting powder, and hence, cannot be used to address claim 28, which reads:

28. The method of claim 21 wherein the total of the solid solution carbide powder of zirconium and niobium and the solid solution carbonitride powder of zirconium and niobium comprises between about 1 weight percent and about 15 weight percent of the total mass of said powder mixture.

Applicant requests the removal of this rejection and the issuance of an indication of the allowability of the claims under rejection.

Brief Discussion of New Claims

Applicant has added new dependent claim 36 which defines the content of the powdered solid solution of zirconium and niobium to be between greater than 10 weight percent and about 15 weight percent. This recitation finds support in the examples of the present patent application. It also defines over Ichikawa et al. which restricts the additive to 5 weight percent (see Column 3, lines 23-29) and over Usami which limits the additive to 10 weight percent (see Paragraph [0124]).

New independent claim 37 defines the providing step in such a fashion as to clearly be patentable over the applied documents:

... providing a powder mixture comprising tungsten carbide powder, a binder metal powder comprising at least one metal of the iron group or an alloy thereof, and at least one or both of one or both of a solid solution carbide powder consisting essentially of zirconium and niobium or a solid

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solution carbonitride powder consisting essentially of zirconium and niobium; ...

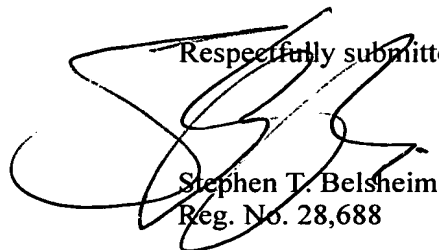
New claims 38 through 40 depend from claim 37, and for reasons as are apparent from the above discussion contain their own bases for allowance in addition to depending from an allowable claim.

New claim 41 is along the lines of new claim 37, except that it adds that the body contains a solid solution carbide of tungsten, zirconium and niobium.

Conclusion

Applicant submits that the claims are allowable over the applied documents, and respectfully requests the issuance of a Notice of Allowability and Notice of Issue Fee Due. However, if the patent examiner disagrees with the applicant's arguments, but has suggestions to place the claims in form for allowance, applicant urges the patent examiner to contact the undersigned attorney (615-662-0100) or Mr. John J. Prizzi (724-539-5331) with such suggestions.

Respectfully submitted,



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